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ABSTRACT

The purpose of this report is to provide performance data on Iowa's adult basic education (ABE) target populations based on the Comprehensive Adult Student Assessment System (CASAS) Employment Competency System Appraisal Form 130 in the areas of reading and mathematics. This report is designed to supplement the data reported in the study titled, "A Workforce Basic Skills Norming Study of Iowa's JTPA and PROMISE JOBS Target Populations." Data were gathered through self-reporting of years of education and student characteristics and CASAS scores, with 1,301 usable questionnaires and test results correlated. Results showed that the majority of participants had completed grade levels 11 and 12. The average reading score was 238.8, and the average mathematics score was 224.1. With approximately 70 percent female and 30 percent male participation, average reading and mathematics scores for each gender correlated with the general average. In age groups, those learners aged 19-25 scored significantly higher than those under 18 years old, and participants over age 60 scored significantly lower than those aged 50-59 years old in reading; whereas mathematics scores did not differ significantly among age groups. Eighty-seven percent of the study participants were white, and they scored significantly higher than blacks and Hispanics on both reading and mathematics. The study concluded that a significant percentage of Iowa's basic skills target populations are capable of beginning instruction at CASAS levels C and D in reading and CASES levels B and C in mathematics. The study also concluded that the scores correlate with age, gender, and years of education similarly to the earlier study. (KC)

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ED 418 245

A Supplemental Report on the Performance Levels of Iowa's Adult Basic Education Target Populations

Iowa Department of Education

January 1998

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A Supplemental Report on the Performance Levels of Iowa's Adult Basic Education Target Populations

Iowa Department of Education
Division of Community Colleges and Workforce Preparation

January 1998

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A Supplemental Report on the Performance Levels of Iowa's Adult Basic Education Target Populations

Introduction

The purpose of this report is to provide performance data on Iowa's adult basic education target populations based on the Comprehensive Adult Student Assessment System (CASAS) Employment Competency System (ECS) Appraisal Form 130 in the areas of reading and mathematics.[1] This report is designed to supplement the data reported in the study titled *A Workforce Basic Skills Norming Study of Iowa's JTPA* and *PROMISE JOBS Target Populations*. The Norming Study was designed to provide critical information about the basic skill levels required for Iowa's basic skills target populations to successfully pursue employment and further education (i.e., taking and passing the GED Tests) and enter vocational/technical training programs.[2]

Background

Iowa's statewide adult basic education (ABE) program has adopted the CASAS ECS Appraisal Form 130 as the standard appraisal instrument for those ABE programs who are adopting competency based approaches for assessment, instruction and curriculum paradigms. The initial Norming Study for Iowa's basic skills target populations was the third and final study in the Iowa Adult Basic Skills Survey (IABSS) series.[3] Since the completion of that study in October 1996, the majority of Iowa's community college based adult basic education programs have continued to use the CASAS ECS Appraisal Form 130 as an initial indicator of basic skills proficiency.

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[1] The reader is referred to the publication titled *Extending the Ladder: From CASAS to Work Keys Assessments* (1997, pp. 9-13) for background information on the CASAS ECS Appraisal Form 130 or consult the CASAS website at *http://www.CASAS.org*.

[2] The reader is referred to the newsletter titled *Iowa's Adult Basic Education Priority Target Populations* (August 1995, pp. 1-6) for a thorough discussion of the target population characteristics.

[3] The reader is referred to the CASAS/IABSS publications for the years *1995a, 1995b, 1996* for an overview of the three studies contained in the IABSS series.

Overview of Data

Since the publication of the Iowa Norming Study, an additional 518 ECS scannable answer sheets have been received by CASAS, scanned and added to the Iowa Norming database of 819. This brings the total number of study participant data records in the Iowa database to 1,337.

Data Methods

Years of Education

Data is self reported. Three study participants indicated years of education of less than six years (one indicated two, one indicated three, and one indicated five). It is more likely that these three study participants did not report accurate educational background information. It was decided to recode the years of education data for these three study participants as System Missing. As a result they were not included in the analysis.

For the purpose of reporting years of education in this analysis, certain grade levels were combined in order to create more equal groups for analysis. Study participants reporting 7 and 8 years of education were combined into one group while students with 13 or more years of education were combined into another group. Study participants with completed years of education of 9,10, 11, 12, 13 years and higher all comprised their own groups.

Reading and Mathematics Scores

A total of 5 study participants achieved a reading raw score of zero while nine students achieved a zero score on the mathematics test. Among these study participants three had raw scores of zero on both tests. Analysis of these cases indicate that study participants achieving zero raw scores did not respond to any of the questions on the test and, therefore, an assumption was made that they either did not take or were not administered the test but did complete an ECS 130 answer sheet. For the purpose of analysis, zero scores were coded as missing and not considered in the computation of mean scores.

Approximately 8 percent of the study participants, in the analysis, were given the CASAS form 400 ECS Appraisal while all others were given the CASAS form 130 ECS Appraisal. The effect of having different tests used in the analysis should be minimal. Both tests provide scores from the lower end of the CASAS scale (180s and 190s). The ECS 130 test does allow for higher scores than those returned by the 400 form due to the fact that the reading and mathematics tests have five additional items that have difficulties that extend beyond the difficulty levels of the 400 appraisal.

Results

Education Levels

Based on the methods described above, the number of students with usable years of education data was 1,301. Their distribution is presented in Table 1. The data indicated that the majority (49%) had completed grade levels 11 and 12.

Table 1 Distribution of Years of Education Completed		
Years of Education	**N**	**Percent**
7th & 8th	126	9.7
9th	193	14.8
10th	232	17.8
11th	275	21.1
12th	364	28.0
13th & Higher	111	8.5
Total	1,301	100.0

Reading Scores

There were a total of 1,332 reading scale scores collected from the study participant data (5 were missing due to zero scores thus equaling 1,337). The average reading score was 238.8 with a standard deviation of 12.4 (*see Table 2*).[4] The average reading score fell in the CASAS level D range.[5] When viewed against years of education, there were data for a total of 1,298 study participants available for analysis.

Mathematics Scores

There were a total of 1,328 mathematics scale scores collected from the study participant data (9 were missing due to zero scores thus equaling 1,337). The average mathematics score was 224.1 with a standard deviation of 12.5 (*see Table 3*). The average mathematics score fell in the CASAS level C range. When viewed against years of education, there were data for a total of 1,294 study participants available for analysis.

Mean Scores

Tables 2 and 3 show the mean reading and mathematics scale scores for the different years of education levels.

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[4] CASAS uses scaled score ranges to describe levels of functional literacy within an employment context that range from "Pre-Literacy" through "Advanced Adult Secondary". Scaled scores and functional descriptors are more valuable than grade completion levels (GCLs) or grade level equivalents (GLEs) as an indicator of basic workforce literacy competency attainment. The reader is referred to the study titled *A Workforce Basic Skills Norming Study of Iowa's JTPA* and *PROMISE JOBS Target Populations* (pp. 23-24) for a discussion of scaled score ranges and GLEs.

[5] The reader is referred to the publication titled *Extending the Ladder: From CASAS to Work Keys Assessments* (1997, p.13) for a description of the CASAS basic skill levels and standard score ranges or consult the CASAS website at *http://www.CASAS.org*.

Table 2
Mean Reading Appraisal Scale Scores
by Years of Education Completed

Years of Education	Mean	N	Percent
7th & 8th	231.5	126	9.7
9th	235.1*	193	14.8
10th	237.7*	230	17.7
11th	240.2*	274	21.1
12th	242.0	364	28.0
13th & Higher	244.1	111	8.5
Total	239.0	1,298	100.00

N= 1,298 $\overline{X}$= 238.8 S.D.=12.4
*Statistically significant differences at the .05 level.

Table 3
Mean Mathematics Appraisal Scale Scores
by Years of Education Completed

Years of Education	Mean	N	Percent
7th & 8th	218.5	126	9.7
9th	220.3	192	14.8
10th	223.9*	230	17.7
11th	224.0*	273	21.1
12th	226.6	362	27.9
13th & Higher	232.1*	111	8.5
Total	224.3	1,294	100.00

N= 1,298 $\overline{X}$= 224.1 S.D.=12.5
*Statistically significant differences at the .05 level.

Correlation Analysis

Data presented in Tables 2 and 3 show a positive relationship between years of education and reading and mathematics score test performance. Correlation results indicate that the relationships between education and standard scores are positive but not extremely strong. This is expected since most study participant's reading skills are usually higher than their mathematics skills. The Pearson Correlation coefficient between scale scores and years of education was .31 for reading and .29 for mathematics.

Analysis of Means

The standard T-test of independence of means was used to determine the following.

Reading Scale Scores

Analysis of the reading scale score means indicated: (1) the 11th year group did score significantly higher than the 10th year's group, (2) the 10th year group scored significantly higher than the 9th year group, (3) the 9th year group scored significantly higher than the 7th & 8th year group. As for the reading scores among study participants with 11 years, 12 years, and more than 13 years, differences were observed but were not statistically significant (*See Table 2*).

Mathematics Scale Scores

Statistical analyses of the mathematics mean scores indicated three areas of statistical difference at the .05 level. First, study participants with less than 10 years of education did score significantly lower than those with at least 10 years. Second, study participants with 10 and 11 years of education scored significantly lower than study participants with at least 12 years of education. Finally, study participants with 13 or more years of education did score significantly higher than those with only 12 years of education (*See Table 3*).

Gender

The subjects in this study included 395 males, 918 females, and 24 subjects who failed to complete the gender portion of the answer form (*see Tables 4 and 5*). Representative percentages of the total were 30 percent male, and 70 percent female.

Table 4
Reading Mean Scale Scores by Gender

Gender	Number	Percentage	Mean	S.D.
Male	395	30	238.0	12.62
Female	916	70	239.3	12.20
Total	1,311	100	238.9	

Table 5
Mathematics Mean Scale Scores by Gender

Gender	Number	Percentage	Mean	S.D.
Male	391	30	225.2*	11.85
Female	916	70	223.7*	12.82
Total	1,307	100	224.1	

*Statistically significant differences at the .05 level.

Analysis of Means

The standard T-test of independence of means was used to determine the following.

Reading Scaled Scores

There were a total of 1,311 reading scores viewed against gender, with an average reading score of 238.0 for males and a standard deviation of 12.62. Females scored an average of 239.3 with a standard deviation of 12.20. Statistical analysis of the reading scaled score means indicates no significant difference between males and females based on mean scaled scores (at <.05 level). The average reading score for both genders fell in the CASAS level D range.

Mathematics Scaled Scores

Mathematics scores from 1,307 study participants were compared with gender. Males averaged a 225.2 scaled score with a standard deviation of 11.85, while females scored an average of 223.7 with a standard deviation of 12.85. Statistical analysis of the mathematics scaled score means indicates a significant difference (at <.05 level) between males and females. The average mathematics score for both genders fell in the CASAS level C range.

Age

There were a total of 1,304 reading scaled scores and 1,300 mathematics scaled scores viewed against age taken from a grand total of 1,337 age responses (30 individuals did not respond to the age question). Age distribution among respondents indicates 86 percent reporting ages below 39 years and approximately 54 percent equal to or below 25 years of age. Twenty-one percent of respondents reported being between 30 to 39 years old and 14 percent were over the age of 40 (*see Tables 6 and 7*).

Table 6
Reading Mean Scale Scores by Age

Age Group	Number	Percentage	Mean
<=18	321	25	236.3
19–25	380	29	240.7*
26–29	146	11	240.6
30–39	276	21	239.2
40–49	116	9	240.3
50–59	36	3	237.6
60+	29	2	227.8*
Total	1,304	100	238.9

*Statistically significant differences at the .05 level.

Table 7
Mathematics Mean Scale Scores by Age

Age Group	Number	Percentage	Mean
<=18	320	25	223.6
19–25	379	29	225.1
26–29	146	11	224.0
30–39	274	21	223.5
40–49	116	9	225.9
50–59	36	3	224.1
60+	29	2	222.3
Total	1,300	100	224.3

Analysis of Means

The standard T-test of independence of means was used to determine the following.

Reading Scores

Statistical analysis of the reading scores indicates those learners from 19 to 25 years old (240.7) scored significantly higher than study participants who were 18 years old or below (236.3). Study participants 60 years old or greater scored significantly lower (227.8) than study participants indicating ages between 50 to 59 years old (237.6). Reading mean scores for study participants in the group 26 to 29 years scored differently than the groups 19 to 25 years, and 30 to 39 years but not at a significant level. Differences were also observed between age groups 30 to 39, 40 to 49, and 50 to 59, but were not statistically significant (*see Table 6*). The average reading scores for age cohorts 18 through 59 fell in the CASAS D level range. The average reading score for age cohort 60+ fell in the CASAS level C range.

Mathematics Scores

Differences of mean mathematics scores were observed between the various age groups, however the differences were not statistically significant (*see Table 7*). The average mathematics reading score for all age cohorts fell in the CASAS level C range.

Ethnicity

There were a total of 1,299 reading scaled scores and 1,295 mathematics scaled scores viewed against ethnicity taken from a grand total of 1,301 ethnicity responses (36 individuals did not respond to the ethnicity question). Ethnicity distribution among respondents indicates 87 percent were White, approximately seven percent Black, four percent Hispanic, and two percent reporting other ethnic backgrounds (*see Tables 8 and 9*).

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Table 8
Reading Mean Scale Scores by Ethnicity

Ethnicity	Number	Percentage	Mean
White (Non-Hispanic)	1,124	87	240.0
Black (Non-Hispanic)	95	7	230.8*
Hispanic	51	4	232.6
Other	29	2	236.6
Total	1,299	100	238.9

*Statistically significant differences at the .05 level.

Table 9
Mathematics Mean Scale Scores by Ethnicity

Ethnicity	Number	Percentage	Mean
White (Non-Hispanic)	1,122	87	225.2
Black (Non-Hispanic)	95	7	216.0*
Hispanic	50	4	218.7*
Other	28	2	225.1
Total	1,295	100	224.3

*Statistically significant differences at the .05 level.

Table 10
Reading Mean Scale Scores by Ethnic Groups

Ethnicity	Number	Percentage	Mean
White (Non-Hispanic)	1,124	86	240.0
All Other Groups	175	14	232.3*
Total	1,299	100	239.0

*Statistically significant differences at the .05 level.

Table 11
Mathematics Mean Scale Scores by Ethnic Groups

Ethnicity	Number	Percentage	Mean
White (Non-Hispanic)	1,122	86	225.2
All Other Groups	173	14	218.2*
Total	1,295	100	224.3

*Statistically significant differences at the .05 level.

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Analysis of Means

The standard T-test of independence of means was used to determine the following.

Mean Scores

In both reading and mathematics, Whites (reading mean 240.0; mathematics 225.2) scored significantly higher than Blacks (reading mean 230.8; mathematics 216.0) at the .05 level. However, in reading and mathematics, no significant differences were observed between Blacks and Hispanics. Interestingly, Hispanics (218.7) scored significantly lower in mathematics than those who indicated the category "Other" ethnic backgrounds (225.1) (*see Tables 8 and 9*). The average reading score for all ethnic groups fell in the CASAS level D range. The average mathematics score for the White and Other ethnic categories fell in the CASAS level C range. The average mathematics score for the Black and Hispanic ethnic categories fell in the CASAS level B range.

Conclusions

The ECS Appraisal Form 130 has been utilized by Iowa's community college based adult basic education program as the statewide appraisal instrument to determine instructional preparedness with identified basic skills target populations. The results of this report indicated:

- a significant percentage of Iowa's basic skills target populations are capable of beginning instruction at CASAS levels C and D certification levels in reading;[6]
- a significant percentage of Iowa's basic skills target populations are capable of beginning instruction at CASAS levels B and C certification levels in mathematics;
- the ECS Appraisal Form 130 is a reliable and accurate indicator of the performance levels of Iowa's basic skills target populations;
- the results of this supplemental report reinforce the initial results reported in the report titled *A Workforce Basic Norming Study of Iowa's JTPA* and *PROMISE JOBS Target Populations*;
- the performance trends observed on the CASAS scale as reported in the initial Norming Study and Supplemental Report for the variables of years of education completed, gender, and age reflect similar performance trends as reported in the Iowa State Adult Literacy Survey (IASALS) for the Prose, Document, and Quantitative scales.

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[6] The Iowa basic skills certification program is referenced in the publication titled *Basic Skills Certification Manual: Guidelines for Iowa's Adult Basic Education Program* (August 1997).

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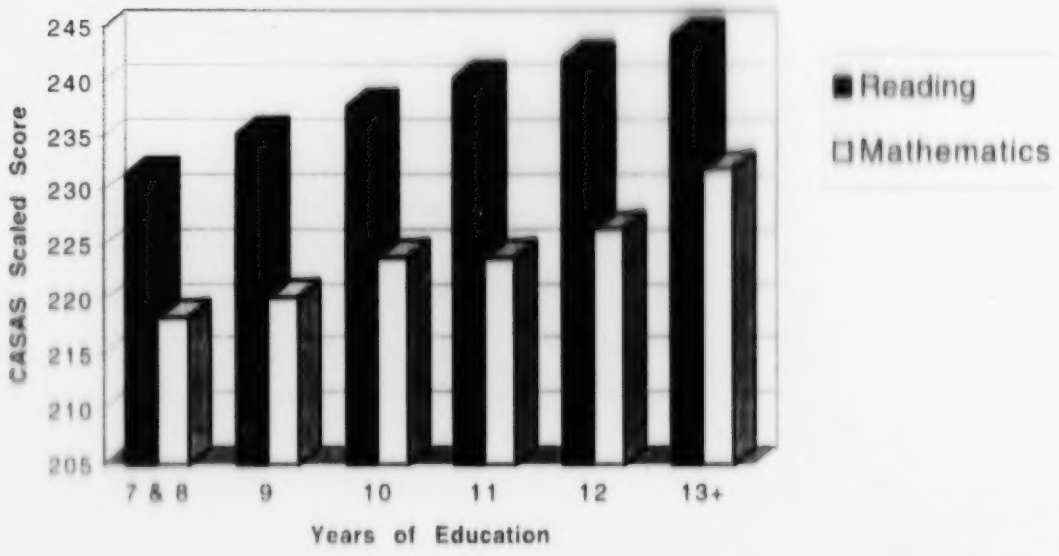
Appendix A

Charts and Graphs to Accompany the Supplemental Performance Report

Graph 1

A Comparison of Mean CASAS Reading and Mathematics ECS 130 Appraisal Scale Scores by Years of Education Completed



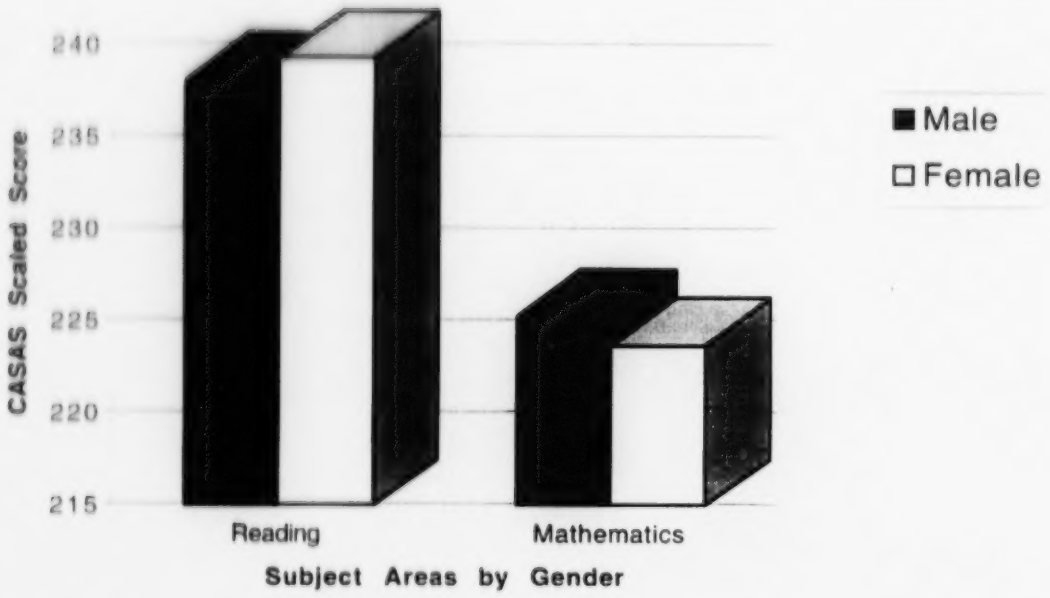
N= 1,298
$\bar{X}$ Reading Score = 238.8 (CASAS Level D range)
$\bar{X}$ Mathematics Score = 224.1 (CASAS Level C range)

Mean reading and mathematics scores increase as years of education increase.

Source: A Supplemental Report on the Performance Levels of Iowa's Adult Basic Education Target Populations: Tables 2 and 3. CASAS, San Diego, CA.

Graph 2

A Comparison of Mean CASAS Reading and Mathematics ECS 130 Appraisal Scale Scores by Gender



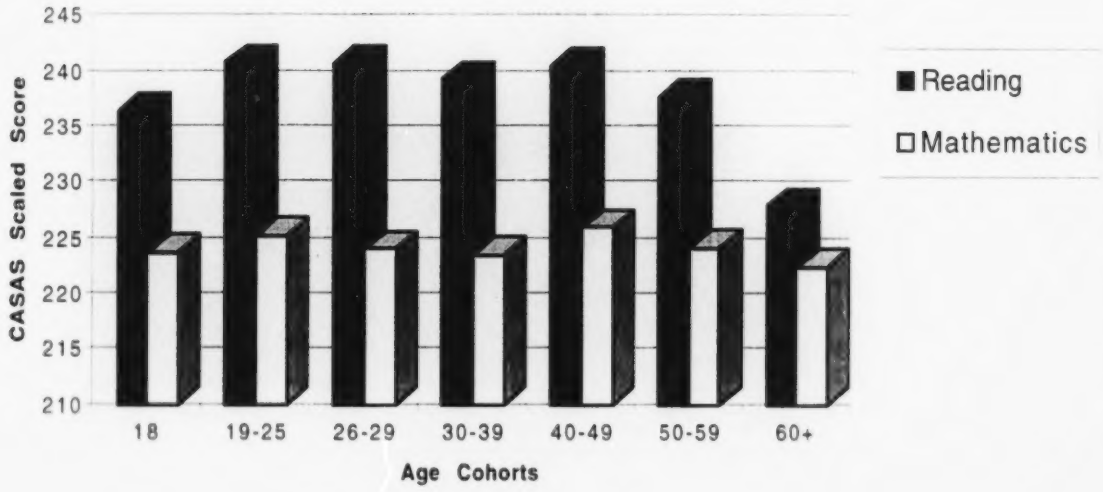
Reading N = 1,311
Mathematics N = 1,307
$\overline{X}$ Reading Score = 238.9 (CASAS Level D range)
$\overline{X}$ Mathematics Score = 224.1 (CASAS Level C range)

Male and female mean scores were approximately the same for each respective subject area.

Source: A Supplemental Report on the Performance Levels of Iowa's Adult Basic Education Target Populations: Tables 4 and 5. CASAS, San Diego, CA.

Graph 3

A Comparison of Mean CASAS Reading and Mathematics ECS 130 Appraisal Scale Scores by Age



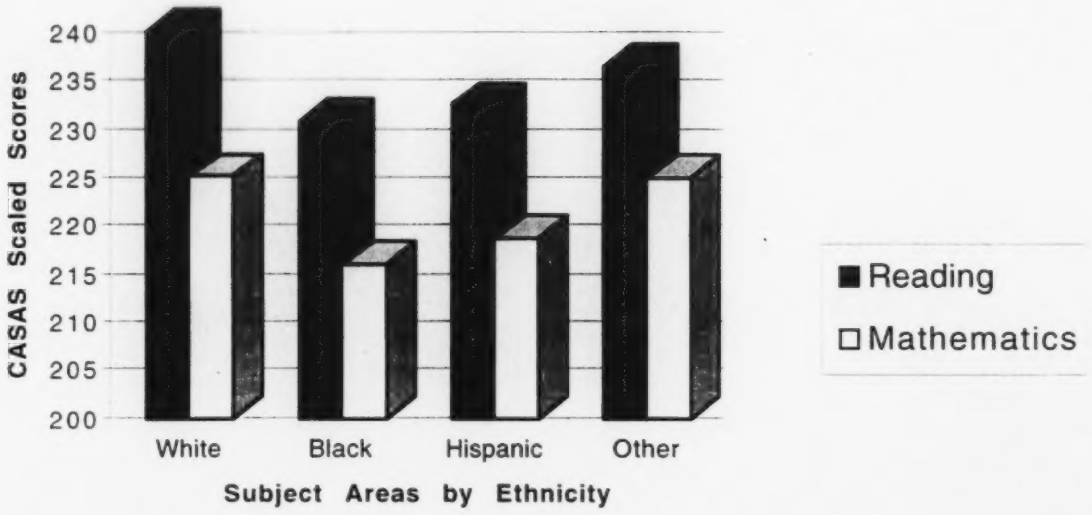
Reading N = 1,304
Mathematics N = 1,300
$\bar{X}$ Reading Score = 238.9 (CASAS Level D range)
$\bar{X}$ Mathematics Score = 224.3 (CASAS Level C range)

Reading and mathematics mean scores hold constant from age cohorts 19-49 but declined for age cohorts 50-59 and 60+.

Source: A Supplemental Report on the Performance Levels of Iowa's Adult Basic Education Target Populations. Tables 6 and 7. CASAS, San Diego, CA.

Graph 4

A Comparison of Mean CASAS Reading and Mathematics ECS 130 Appraisal Scale Scores by Ethnicity



Reading N = 1,299
Mathematics N = 1,295
$\overline{X}$ Reading Score = 238.9 (CASAS Level D range)
$\overline{X}$ Mathematics Score = 224.3 (CASAS Level C range)

There were significant differences in the mean reading and mathematics scores between White and all other ethnic groups.

Source: A Supplemental Report on the Performance Levels of Iowa's Adult Basic Education Target Populations. Tables 8, 9, 10 and 11. CASAS, San Diego, CA.